

Steve Wendland, PE, PG, DGE

Curriculum Vitae - September 2022

steve@bedrockgeoconsult.com
913.475.5851

Total Years of Experience
34 Years

Education
MS, Civil Engineering
(Geotechnical Emphasis),
University of Texas at Austin

BS, Magna Cum Laude,
Geological Engineering, Missouri
University of Science &
Technology

Registrations / Certifications
Professional Engineer (PE), Civil:
AR, AZ, CO, IA, IL, IN, KS, KY,
MD, MI, MN, MO, NE, OK, OR,
TN, TX, WI, WY

Professional Engineer (PE),
Geological: AZ

Professional/Registered Geologist
(PG/RG): KS, MO

Board Certified Geotechnical
Engineer (DGE): [Academy of
Geo-Professionals](#)

Bedrock GeoConsult, LLC **President and Founder**

Mr. Wendland started Bedrock Geoconsult in August 2022 to provide expert geotechnical engineering and engineering geology consulting services to a variety of clients and projects throughout the central US. His passion for high quality work, exceptional attention to detail, and practical guidance improve the geotechnical engineering outcomes for his clients. Subsurface risk is reduced, construction schedules are shortened, and construction costs are lowered.

Bedrock GeoConsult helps contractors, owners, legal counsel, and design teams overcome the concerns caused the commoditization of geotechnical engineering services by providing third-party peer reviews, independent guidance, construction engineering support services, and expert opinions. Bedrock GeoConsult also provides direct geotechnical engineering for clients and projects that value high-quality, practical guidance, delivered with clear communication.

He has 34 years of experience in geotechnical engineering and has analyzed and designed foundations for many bridges, power generation facilities, commercial developments, industrial facilities, electric transmission lines, aviation facilities, office buildings, wastewater treatment plants, and marine structures. He has worked with the analysis of large dams, earth retaining structures, ground improvement systems, soil and rock anchors, reservoirs, solid waste landfills, roads and highways, and seismic analysis of foundations and earth structures.

Mr. Wendland has also conducted geotechnical forensic analyses of structures that have been impacted by expansive clay soils, compressible foundation bearing materials, and poor construction. These forensic analyses have included a variety of failed retaining walls, cut slopes, embankments, foundations, and floor slabs. Mr. Wendland is experienced in supervision of field operations; he has been resident engineer for several foundation construction, earthwork, and landfill projects in varied geotechnical and geological environments. He has worked as the project manager for special inspections services for large commercial developments, government facilities, wastewater and water treatment plants, aviation facilities, and highway and bridge projects.

Select Professional Activities

[Geoprofessional Business Association](#) (GBA) – Since 2020 serving on the Board of Directors, previously served as vice chair of Business Practices Committee and on a special Task Force to “bridge the gap” between geotechnical engineers and geotechnical specialty contractors.

[ASCE/SEI XX Design and Construction of Foundations](#) – Since 2019 serving as a member of steering committee that is creating this new design standard. Co-chair of Spread Foundations subcommittee. When completed, this new national foundation design standard will replace Chapter 18 of the International Building Code.

American Society of Civil Engineers and Geoprofessional Business Association, Joint Committee for Professional Practice and Ethics and Leadership Award, 2016 to 2018. Committee Chair in 2018. Led group of eight select committee members in the solicitation and review of nominations for annual ethics award.

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Geo-Institute of the American Society of Civil Engineers, 2014 to 2016, served as judge for National GeoWall student competition. Reviewed, critiqued, and graded dozens of retaining wall design summaries that were submitted by teams of students from various universities for an annual competition.

Building Seismic Safety Council, 1996 to 2000, Corresponding Member for Non-Uniform Building Committee, providing input on seismic analysis of retaining walls.

Publications

Case History Number 108, Geoprofessional Business Association (GBA), 2020, Case history of significant litigation against geotechnical engineer when expansive clays damaged a four-story commercial building (published anonymously).

Impacts of Super-Fast Construction on Slope Stability, Proceedings of the 29th Central Pennsylvania Geotechnical Conference, 2017, Controlling liability and unstable slopes on fast-paced projects.

The Value of General-Contractor-Oriented Geotechnical Peer Reviews, Proceedings of the 28th Central Pennsylvania Geotechnical Conference, 2015, Having a geotechnical engineer on the contractors' team can result in a better project.

Lessons Learned from Retaining Wall Failures, Proceedings of the 27th Central Pennsylvania Geotechnical Conference, 2014, Role of water and communication in retaining wall failures

When Retaining Walls Fail, Civil Engineering News, 2011, Role of water and communication in retaining wall failures

Where Did All the Dirt Come From? A Primer on the Origin of Kansas City's Soil, Kansas City Business Journal, 2005, Origin of various soil types in the Kansas City area

Subsurface Risk at the Urban Project Site, Kansas City Business Journal, 2003, Dealing with uncontrolled rubble fill at urban project sites

Two Generations of Complex Foundations for the Liberty Memorial, Kansas City Business Journal, 2002, Underpinning existing foundations for expansion of national monument structures.

What's Under That Parking Lot? Parking, 2001, Risk of unforeseen subsurface conditions below pavements

Know What You Are Digging Into, Roads & Bridges, 2001, Importance of geotechnical engineering for road projects

Jet-Grouted Cantilever Wall for Slope Stability, Grouts and Grouting: A Potpourri of Projects, ASCE Geotechnical Special Publication Number 80, 1998, Use of jet grouting to stabilize slope failure and underpin an electric transmission line structure

Cost Effective Geotechnical Investigation Made for Transmission Line, Transmission and Distribution, 1989, Subsurface exploration for a 313-mile 345kv electric transmission line in mountainous terrain

Technical Presentations and Seminars Given

Transportation Engineering Association of Missouri (TEAM). "Lessons Learned from Retaining Wall Failures – Volume 2". Invited presentation at 2022 TEAM Conference. Also made this presentation at American Society of Civil Engineers (ASCE) 2022 Kansas City Geotechnical Conference.

Construction Specifications Institute (CSI). "Lessons Learned from Retaining Wall Failures", Invited presentation to Kansas City chapter, 2021, focused on construction specification aspects of failures.

International Code Council (ICC), Testified before the ICC regarding proposed changes to building codes that would reduce the risk of expansive clays damaging sanitary sewers and thereby causing damage to building foundations and floors, 2020 hearings.

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ASCE Kansas City Chapter. "The Broomfield Claim: Lessons Learned Regarding Expansive Clays", Invited presentation at the 2020 Kansas City Geotechnical Conference. Also invited to make this presentation at ASCE St. Louis Chapter's 2021 Geoconfluence conference and at ASCE Omaha Chapter's 2021 GeoOmaha conference.

Geoprofessional Business Association (GBA). "Project Records Retention in the Digital Age". Co-presented with expert attorney on complications of social media use by employees; 2019 Fall Conference

GBA. "Holding the Hand of General Contractors for Fun and Profit", The benefits of having a geotechnical engineer representing and supporting general contractors; 2018 Fall Conference

ASCE Central Pennsylvania Chapter. "Impacts of Super-Fast Construction on Slope Stability". An invited presentation on this topic, 2017. Also given at the 2017 ASCE Kansas City Geotechnical Conference.

ASCE Kansas City Chapter. "A Discussion Regarding the Geotechnical Standard of Care in Kansas City". Presentation on the complexities of defining the standard of care, 2016.

ASCE Central Pennsylvania Chapter. "The Value of General-Contractor-Oriented Geotechnical Peer Reviews", 2015, an invited 1-hour presentation on this topic.

ASCE Oklahoma City Chapter. "Lessons Learned from Retaining Wall Failures." Made an invited presentation, 2015. Also invited to make this presentation at ASCE Central Pennsylvania Chapter in 2014, ASCE St. Louis Chapter's 2012 Geoconfluence conference, and Omaha Chapter's 2012 GeoOmaha conference.

Design Build Institute of America (DBIA), Kansas City Chapter, "Geotechnical Considerations in Design-Build Contracting." Made an invited presentation, 2014. Repeated for the Ozarks Chapter, 2014.

Federal Highway Administration (FHWA) Midwest Geotechnical Conference, 2013. "Lessons Learned from Retaining Wall Failures".

Transportation Engineering Association of Missouri (TEAM). "When Retaining Walls Fail - Lessons Learned". Made an invited presentation at 2011 TEAM Conference.

ASCE Kansas City Chapter, "Communications Failure = Retaining Wall Failure". Made a presentation at the 2010 Annual Specialty Seminar.

"Lessons Learned from Retaining Wall Failures", Invited presentation to civil engineering graduate students at Univ. of Missouri (2005 and 2012), Missouri Univ. of Science & Tech. (2011), Univ. of Arkansas (2012), North Carolina St. Univ. (2013), Univ. of Wisc. (2013), Univ. of Texas at Austin (2014)

"Electric Transmission Line Geotechnical Design Considerations", Invited presentation to civil engineering graduate students, Univ. of Missouri-Columbia (1990 and 2013).

Previous Employment

GeoEngineers, Inc.

Senior Principal Geotechnical Engineer, 2021 to 2022

Opened new office in Kansas City, hired three engineers. Provided geotechnical expertise to projects nationwide. Completed forensic evaluations of design and construction failures. Provided expert engineering services to outside attorneys involved in geotechnical claims.

Kleinfelder, Inc.

Director of Geo-Engineering 2011 to 2021

From 2013 to 2021, he served as Kleinfelder's Director of Geo-Engineering. In this role, Mr. Wendland led high quality, efficient geotechnical and geological engineering work among Kleinfelder's 220 geotechnical engineers and engineering geologists for projects throughout the United States and internationally. From 2011 to 2013, he was Kleinfelder's national Technical Practice Leader for the design and construction of large retaining walls.

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TSi Engineering

Area Manager 2006 to 2010

Responsible for business development, building client relationships, financial management, geotechnical engineering, recruiting, training, managing of construction inspection projects, and working with the company owners to develop strategic plans. Started new office In August 2006. Started local materials testing laboratory in January 2009. By mid-2009, had grown to a staff of nine, with engineers, geologists, and technicians. In 2009, our gross revenue for the Kansas City offices was \$1.3M.

GeoSystems Engineering / Kleinfelder

Area Manager / Senior Associate (after merger with Kleinfelder in April 2002), 2002 to 2006.

Area Manager, with full responsibility for office operations, including a staff of 52 and annual revenue of \$5M. Responsibilities included business development, client relations, financial management, geotechnical engineering, quality reviews of construction inspection reports, safety, loss prevention, training, and recruiting. Developed a thorough, detailed understanding of financial aspects of the job. Provided engineering expertise to Kleinfelder's offices nationwide. Vice Chairman and Chairman-Elect for the fiduciary committee of Kleinfelder's Employee Stock Ownership Plan (ESOP). Direct Shareholder.

Engineering Manager (prior to merger with Kleinfelder) 1999 to 2002

Managed department of 14 geotechnical engineers, drillers, and laboratory technicians. Responsible for the department's workload and profitability. Served as project manager and lead engineer for a wide variety of projects. Vice President, Shareholder, and member of the Board of Directors. Played a key role in the negotiations when we sold the firm to Kleinfelder in 2002.

Black & Veatch

Geotechnical Supervisor for Power Division, 1996 to 1999

Led a multi-cultural group of 14 geotechnical engineers and geologists and directed the geotechnical work for over \$1.1B of design/build projects annually. Kept the staff highly skilled at providing services for Engineer-Procure-Construct projects, including fast-track designs and intensive efforts to reduce construction costs and schedules. Led an effort in the Civil Engineering Department to overhaul the company's construction specifications. Assisted with company-wide recruiting of civil engineers.

Geotechnical Engineer, 1988 to 1996

Completed geotechnical investigation, analysis, and design for projects throughout the United States and internationally. Consistently received highest evaluations in annual reviews. Projects were primarily power generation and transmission, but many others were industrial, petrochemical, commercial, and wastewater facilities. Larger projects included nuclear power plants in Taiwan and Japan, \$1B coal-fired power plants in Florida and Indonesia, as well as large oil refineries. Worked at project sites in 13 countries, learning the local cultural and business practices in each one and adapting designs to limitations of available construction technology in under-developed countries. Worked as resident engineer for year-long construction projects in New Mexico, Oregon, and Texas. These long-term field assignments and numerous other short-term field assignments provided experience on actual field practices and problem solving in the field.

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Example projects are provided on the following pages in these categories: Expert Support for Litigation, Forensic Evaluations and Repairs, Federal, Dams and Levees, Electrical Transmission, Electrical Generation, Solar Power, Oil & Gas / Ethanol, Industrial, Commercial and General Buildings, Data Centers, Transportation, and Water and Wastewater Treatment.

Expert Support for Litigation

Holloway Substation - Slope Failure Analyses, Mead Township, Ohio

Working for the project design/build firm, Mr. Wendland provided senior quality review for the forensic and expert analyses of slope failures at a large, remote electric substation. He assisted with the determination of the root cause which was inaccurate analyses and lack of familiarity with the local geology by the geotechnical engineer of record. Mr. Wendland provided expert assistance during the litigation.

Brink Meyer Road Retaining Wall Failure, Parkville, Missouri

Lead geotechnical engineer for the forensic evaluation of the failure of a 43-foot tall mechanically stabilized earth retaining wall. The wall experienced large-scale internal failures during a heavy rain eight months after it was constructed. Mr. Wendland evaluated the design, construction documents, and construction material testing records. He provided expert services to the City of Parkville during the litigation including preparation for a jury trial.

Retaining Wall Failures and Fill Placement Discrepancies – Medical Education Building, Reno, Nevada

Working for the general contractor, Mr. Wendland provided expert support when the owner of the building made a multi-million-dollar claim alleging that unsuitable fill materials had been used and the fill had not been properly compacted, leading to settlement and damage to two large concrete retaining walls. Mr. Wendland evaluated construction records to evaluate the claim, reviewed design documents to determine if there were other causes of the distress, and attended arbitration hearings.

High School Running Track and Soccer Field Retaining Wall Failure, Kansas City, Missouri

Mr. Wendland provided expert support to the general contractor's attorney when a 35-foot-tall retaining wall experienced a global failure approximately two years after completion of construction. He completed a forensic evaluation of the design and construction of the retaining wall. The failure was caused by a reduction of the strength of the soils supporting the wall foundation when the soil was exposed to groundwater. The design of the wall did not account for this long-term strength reduction in the soils. He provided expert support during mediation.

Cedar Creek Sewer Tunnel under I-35, Olathe, Kansas

Provided services to the City of Olathe, Kansas, during construction of a sewer tunnel under an interstate highway. The tunnel construction experienced difficulties and year-long delays associated with variable subsurface conditions. Mr. Wendland provided technical assistance to the city in their evaluation of claims from the contractors.

Arizona Interconnection 345kV Electric Transmission Line, Southern New Mexico

Working for the electric utility owner, Mr. Wendland provided courtroom testimony in land condemnation hearings to establish the impact on construction schedules if the planned right of way was not immediately available.

Healthcare Building Foundation Movement Analysis, Clyde, Missouri

Working for the owner, Mr. Wendland provided expert forensic evaluation of distress to a recently constructed medical building. Shortly after construction, the building experienced foundation movements and floor slab cracking. Expansive clay soils were the cause of the damage. The design/build contractor had not followed recommendations from the project geotechnical engineer. Mr. Wendland helped the owner negotiate an extended warranty and financial compensation.

Manhole Backfill Settlement, Lincoln, Nebraska

Working for the general contractor's attorney, Mr. Wendland provided expert services to evaluate the settlement of backfill around a deep manhole structure. The City of Lincoln had filed a claim stating that the contractor had not properly compacted the backfill, resulting in distress to the overlying street pavement. Mr. Wendland completed a forensic analysis showing that the backfill had been properly compacted, and that the pavement distress had been caused by erosion caused by poor surface water management.

Lenexa Logistics Center Changed Subsurface Conditions Claim, Lenexa, Kansas

Provided services to the developer of industrial park when the earthwork contractor submitted a multi-million dollar claim of changed subsurface conditions. The contractor claimed that bedrock was shallower and harder than

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indicated by the project geotechnical report. Mr. Wendland completed a geologic evaluation of the project, reviewed the available subsurface information, analyzed the contractor's claim, and provided expert assistance during discovery and the arbitration of the claim.

Gibbsland-Coleman High School Track Facility Retaining Wall Failures, Gibbsland, Louisiana

Working for the local School Board's attorney, Mr. Wendland provided expert services for litigation related to the failure of four large mechanically stabilized earth retaining walls. Mr. Wendland evaluated design and construction, completed a forensic evaluation, and supported the school board through mediation and trial preparation.

President George Bush Tollway – Retaining Wall Failure Analyses, Dallas, Texas

Working for the Turnpike Authority, Mr. Wendland provided senior quality review for the forensic evaluation of large-scale retaining wall failures. He assisted with determination of the root cause of the distress and recommended repairs. Mr. Wendland provided expert assistance during the litigation.

Cut Slope Failures – Military Policy Battalion Headquarters, Fort Leavenworth, Kansas

Working for the construction manager, Mr. Wendland provided expert support in a multi-million dollar claim of changed subsurface conditions when excavations experienced widespread slope failures. The investigation focused on slickensided joints in the shale bedrock and whether the slope failures caused by them should have been anticipated by the project design team.

Truck Unloading Structure Failure – Dolet Hills Lignite Mine, Armistead, Louisiana

Working for the general contractor, Mr. Wendland provided expert services when a large soldier pile and lagging retaining structure failed during construction. Mr. Wendland completed a detailed analysis of the design. The structure failed due to a combination of poorly designed structural connections and excessive settlement.

Forensic Evaluations and Repairs

Austin-Bergstrom International Airport Retaining Wall and Embankment Repairs, Austin, Texas

Senior geotechnical engineer and senior quality reviewer for design and construction of repairs to approach embankments, large retaining walls, drive lanes, and a bridge deck that supports all departure traffic at the airport's main terminal. The 23-year-old structure was damaged by expansive clays. Mr. Wendland led the forensic analysis, design of anchoring and re-facing of retaining walls, underpinning of bridge foundations, and stabilization of embankments.

Nebraska Highway 1 Embankment Failure, Murray, Nebraska

Led the forensic evaluation of a large-scale slope failure during construction of the widening of this 30-foot-tall earthen embankment and soil-nail retaining wall. Mr. Wendland evaluated concerns with control of surface water. He also evaluated how field changes to the design of the temporary soil-nail retaining wall reduced the stability of an excavation which led to the failure.

Holland Cliff Slope Stabilization and Foundation Underpinning, Calvert County, Maryland

Lead geotechnical engineer for the analysis and repair of a bluff along the Patuxent River where repeated shallow slope failures were threatening the 500kV electric transmission line that supplied all the electricity to the county. Mr. Wendland designed an underpinning system for the power line towers using a combination of chemical grouting and post-tensioned tiebacks. He designed a slope stabilization system using jet grouting. The design of the system had to consider that the overhead 500 kV line had to stay in service while work proceeded directly under the line.

US36 Retaining Wall Failure, Broomfield, Colorado

Lead engineer for the forensic evaluation of a large-scale global failure of a mechanically stabilized earth retaining wall that occurred several years after construction. An accumulation of water within the wall backfill had occurred due to damaged drain lines, causing a weakening of the foundation soils below the wall.

Teddy Roosevelt National Park Slope Repairs, Medora, North Dakota.

Mr. Wendland developed the subsurface investigation for a portion of the park roadway that was experiencing a slow-moving slope failure. The analysis indicated the failure was triggered by poor drainage on the uphill side of the road and recommendations were developed that involved excavating the unstable area, installing subsurface drains, correcting surface drainage, and reconstructing the roadway.

Baker-Broadford 765kv Line Emergency Repair, Eastern Kentucky

Mr. Wendland provided senior geotechnical review for the reconstruction of four steel monopole towers after a tornado destroyed the existing structures. The work was completed on an accelerated schedule. The mountainous terrain limited foundation support options. The project team developed a micropile-based foundation system which could be constructed quickly without requiring access to the sites by large trucks.

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Repair of Slope Failure along Main Street, National World War I Museum, Kansas City, Missouri

Provided geotechnical engineering and engineering geology peer review and value engineering services for the planned repair of a slope failure at this National Monument. The slope failed after dense vegetation had been removed and subsequent heavy rainfall. The construction costs for the original plans for the repair exceeded project budgets by 300%. He was retained by the construction manager and worked with the project team to develop an alternative approach to the stabilization using a soil nail retaining wall that reduced construction costs by 50%.

Shoring Failure at Galena Park Terminal, Houston, Texas

Lead geotechnical engineer for the forensic evaluation of failed sheet pile shoring at an oil terminal along the Houston Ship Channel. The shoring consisted of steel sheet piles with grouted tiebacks in loose sand and stiff clay soils. The tiebacks failed load tests, necessitating a redesign of the shoring. The conclusion was that loose sand seams present within the soils had not been properly accounted for in the design and construction of the shoring.

Costco Warehouse Floor Slab Heave, Hanam City, South Korea

Provided forensic services when the floor slab of a large retail building heaved several inches and was badly cracked during construction. The floor was in the basement level and the damage occurred during a period of heavy rain. Mr. Wendland directed the subsurface exploration on site in South Korea, reviewed the construction history with the local design team and contractors, and developed repair plans. The heave had occurred because below-floor drains were backfilled with unsuitable materials, causing the buildup of hydrostatic pressure under the floor.

Sunrise Assisted Living, Broomfield, Colorado

Led the forensic evaluation of the damage to a building by expansive clay soils. He evaluated leaking sewer lines that caused the underlying clay to swell, damaging foundations, walls, and floors.

Scour Repair – Bridge over Berryhill Creek, Tulsa, Oklahoma

Mr. Wendland was the lead geotechnical engineer for the analysis of scour that damaged the abutment of an existing bridge. Dumping of demolition debris in the creek channel had forced a realignment of the creek channel that scoured away the bridge abutment. Mr. Wendland designed a gabion retaining wall to protect and stabilize the abutment and a gabion blanket to limit further scour in the bottom of the creek channel.

Little Blue WWTP Settlement Evaluation, Jackson County, Missouri

Mr. Wendland was the lead geotechnical engineer for a forensic evaluation of settlement that was causing damage to floor slabs at an existing wastewater treatment plant. The site was underlain by soft alluvial clay soils to a depth of 80 feet. Mr. Wendland determined that long term creep (secondary consolidation) was the cause of the settlement and developed mitigation measures to correct for the settlement including polyurethane injection below floor slabs.

Reconstruction of 138kV Electric Transmission Line, Mason City, Iowa

Mr. Wendland was the lead geotechnical engineer for the forensic analysis and reconstruction of a high voltage power line that failed during an ice storm. He determined which foundations could be re-used and designed large diameter drilled pier foundations for new monopole structures.

Settlement Evaluation at Wal-Mart, Bristow, Oklahoma

Mr. Wendland provided forensic geotechnical engineering when the building experienced settlement and lateral movement of the back portion of the building and the nearby retaining wall soon after it was constructed. He installed inclinometers to measure the lateral movements in the fill that was placed under the store and completed a subsurface exploration to evaluate the materials and placement of the fill. It was determined that unsuitable materials including construction debris were included in the fill, causing mass movement of the fill section downslope. Repairs included anchoring of the retaining wall and polyurethane injection in the fill.

Evaluation of Retaining Wall Movements at Costco Parking Lot Expansion, Redmond, Washington

Mr. Wendland completed a forensic evaluation of the large-scale movements of a 30-foot-tall gabion retaining wall. The top of the wall had deflected over 12 inches and settled over 10 inches within three months after completion of construction. The forensic evaluation determined that the wall backfill was placed at a very high moisture content and a high organic content. Mr. Wendland developed a plan for partial reconstruction of the wall to prevent a failure.

Pavement Failure at The Home Depot, Hammond, Louisiana

Led the forensic evaluation of a large-scale pavement failure that occurred within months of pavement construction at a new retail store. The failure was caused by uncontrolled heavy truck traffic on lite-duty pavements and excessive irrigation softening the subgrade.

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Cheyenne Avenue Fault Damage, North Las Vegas, Nevada

Mr. Wendland was the senior geological engineer reviewer for the evaluation of damage to an arterial road from movement along growth faults. He also assessed the risk of additional damage from future movement along the faults and developed remedial measures to limit damage to subsurface utilities and the pavement surface.

Quindaro Hills Slope Failure and Micro-Tunneling, Kansas City, Kansas

Lead geotechnical engineer and project manager for the forensic evaluation of a slope failure that put six gasoline pipelines out of service. He worked with the client and contractors to develop a fast-track plan to construct three 2500-foot-long micro-tunnels under the slope failure so that the pipelines could be rerouted and put back in service as quickly as possible. The overall project cost, including lost pipeline revenue, to the client was over \$14MM.

Repair of Slope Failure at Flight Safety, Broken Arrow, Oklahoma

Mr. Wendland was the lead geotechnical engineer and project manager for the forensic evaluation and repair design for a landslide adjacent to a manufacturing facility. The slope failure occurred when the uncompacted topsoil fill that had been placed there became saturated during a period of heavy rain. The repair consisted of installing a series of subsurface drains and compacting the fill materials.

Evaluation of Oil Storage Tank Settlement, Houston, Texas

Mr. Wendland completed a forensic evaluation of the settlement of two large oil storage tanks along the Houston Ship Channel after flooding in the area during Hurricane Harvey. He developed plans for underpinning the tanks.

Evaluation and Mitigation of Seepage from Water Supply Canal, Boulder, Colorado

Led a forensic evaluation of seepage from a water supply canal that caused a slope failure. The canal was unlined and was excavated in limestone and shale bedrock. Many years after being put in service, the canal began to lose water and a portion of it experienced a slope failure in the hillside below the canal. Mr. Wendland determined that joints within the bedrock had become more permeable as their natural infill materials had eroded, leading the increased seepage and slope failure. Mr. Wendland designed a grouting program to seal the joint.

Foundation Underpinning for Watermill-West Levee 345kv Line, Dallas, Texas

An electric transmission line began to experience lateral bearing capacity failures of its drilled pier foundations as it was being constructed. Mr. Wendland completed a fast-track analysis of the design errors and developed a series of ground improvement and underpinning solutions to improve the foundation capacities while allowing construction of the project to continue. The primary ground improvement method utilized was jet grouting. Mr. Wendland provided full time field direction of the work.

Summit Woods Target Forensic Evaluation of Floor Slab, Lees Summit, Missouri

A Target store that is approximately 10 years old began to experience significant heaving in the floor slab in some areas. Mr. Wendland directed a subsurface exploration in the interior of the store to evaluate the cause of the heaving and develop recommendations for repair. The exploration uncovered frozen soil below the floor slab caused by improperly operating cooling equipment.

Wal-Mart Settlement Forensic Evaluation, Gardner, Kansas

A Wal-Mart store experienced steady long-term settlement. Mr. Wendland developed a plan for subsurface exploration to determine the cause of the settlement. The investigation uncovered a zone of soft, organic soil buried approximately 5 feet below the footings. Mr. Wendland developed recommendations for underpinning the building.

Tulsa Hills Target Forensic Evaluation, Tulsa, Oklahoma

Mr. Wendland was the lead geotechnical engineer for forensic evaluation of a Target store that experienced over 6 inches of foundation settlement approximately six years after the building was constructed. Mr. Wendland reviewed construction documents, planned and directed a subsurface exploration, determined the cause of the settlement, and developed remedial measures for limiting further settlement. The cause of settlement was a nearby water main with a substantial leak. The water from that leak was flowing along the continuous wall footings and saturating the underlying fill materials. The foundations were stabilized by injection of polyurethane foam.

South Portland Target Forensic Evaluation of Settlement, South Portland, Maine

Mr. Wendland led a forensic evaluation of a Target store that had experienced approximately 20 inches of settlement over a 15-year period after its construction. The building spanned a significant geologic variation, with the north portion of the structure bearing directly on strong bedrock and the south portion bearing on 30 feet of soft, compressible clay soils. The building began settling immediately after construction and has continued settling to the present. Mr. Wendland developed a system of monitoring the on-going settlement, periodically evaluating the structure for structural damage, and planned maintenance to repair cosmetic damage to the building.

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Target Distribution Center Settlement, Topeka, Kansas

Mr. Wendland completed a forensic geotechnical evaluation of observed settlement of the floor slab. The building floor had settled several inches over a five-year period, approximately ten years after the building was constructed. Mr. Wendland planned and directed the subsurface exploration, both inside and around the exterior of the building. His evaluation showed that the slab settlement and distress was caused by a thick layer of topsoil with a high organic content that was in place below the building. As the organic material slowly decayed, the overlying floor slab was settling. Mr. Wendland provided recommendations for monitoring and remediation of the settlement.

Federal

Slope Failures at MP Battalion Headquarters, Fort Leavenworth, Kansas

Mr. Wendland provided geotechnical engineering services to the design/build contractor to address a series of slope failures that occurred in cut slopes at the project site. The slope failures have occurred due to weak, jointed bedrock and groundwater seepage. Mr. Wendland worked together with the client, the design engineers, and the USACE to determine the best methods of repairing and stabilizing the failed slopes.

Geotechnical and Construction QC, WW1 National Memorial Restoration, Kansas City, Missouri.

Mr. Wendland provided geotechnical and construction QC review for the restoration and expansion of the national World War I Memorial. The project involved building a new observation deck with support columns and a new south mall and auditorium, restoring the limestone veneer, restoring the interiors of the exhibit halls, and creating space below the memorial for a museum. Concerns for limiting differential settlement was a key design issue.

Landfill Cover at Andersen Air Force Base, US Air Force, Guam

Mr. Wendland designed the synthetic liner system and soil cover for an existing landfill in a high seismic zone. Design was complicated by the fact that the landfill had been used as a naval firing range; unexploded ordinance in the landfill prevented any excavation within the existing materials for grading or anchor trenches.

Civilian Education System Building Renovation, Fort Leavenworth, Kansas

Mr. Wendland was the project manager for special inspection services and the lead geotechnical engineer for this project which involved the renovation of five buildings. The buildings were as much as 150 years old. Geotechnical engineering services included design of retaining walls.

Command and General Staff College - Lewis & Clark Center, Fort Leavenworth, Kansas

Geotechnical project manager for this large, important military education facility. He directed the subsurface exploration and reviewed foundation designs. He provided geotechnical engineering assistance during construction, including evaluation of drilled pier foundations that encountered karst solution cavities within the limestone bedrock.

Submarine Magnetic Silencing Facility, Corpus Christi, Texas

Mr. Wendland was the geotechnical engineer for this submerged marine structure in the Gulf of Mexico. He designed a drilled-pier foundation system which utilized fiberglass-reinforced concrete.

Dams and Levees

Naughton Power Plant Ash Pond Reservoirs, Kemmerer, Wyoming

Lead geotechnical engineer for the design, permitting, and construction of three large earthen dams for new reservoirs at a large coal fired power plant. The reservoirs acted as storage basins for coal ash slurry. The dams were 2.5 million cubic yards in volume and were as tall as 140 feet. Geotechnical challenges included control of seepage through the highly jointed shale bedrock and an evaluation of the long-term shear strength decrease of the shale as it became saturated from reservoir water. The project's permitting received commendations from the State of Wyoming for the thoroughness of the permit documents.

Rio Caguitas Levee and Channel Improvements, Caguas, Puerto Rico

Mr. Wendland was the lead geotechnical engineer for seepage and stability analysis of an enlarged levee. He also designed soil nail retaining walls in areas where the river channel was to be widened.

East Bottoms Levee and Storm Sewer Pump Station, Kansas City, Missouri

Mr. Wendland completed a detailed seepage, scour, and slope stability analysis for a multi-phase relocation of the levee, including the design of a new storm water pump station and water intake channel on the landside of the levee. The effort included multiple reviews and permit negotiations with the USACE.

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Sullivan County Dam, Milan, Missouri

Completed planning of subsurface investigation and field testing for the proposed site of a new reservoir and earth-fill dam. The site has alluvial sands which would allow seepage of the reservoir water under the dam and sandstone units in the abutments which would allow seepage through the abutments. Mr. Wendland analyzed alternatives for reducing seepage and developed recommendations for the most cost-effective solutions.

Hiko Springs Detention Basin, Laughlin, Nevada

Lead geotechnical engineer for the design of an earthen dam for a large flash-flood detention basin. The embankment was constructed with locally available rock and caliche fragments. While the fill material was relatively permeable, the reservoir will only have water during periods of heavy rainfall. During those periods, water levels in the reservoir would rise and fall rapidly, subjecting the embankment to sudden seepage pressures, then rapid drawdown conditions. Mr. Wendland completed a detailed transient seepage analysis and slope stability analysis of the embankment to determine if the rapid drawdown would endanger the embankment.

J.C. Boyle Dam, Klamath Falls, Oregon

Lead geotechnical engineer for a detailed seismic analysis of an existing rock fill hydroelectric facility. The dam was designed and built in the 1960s, at a time with the seismicity of the southwestern Oregon area was not a significant concern. As the seismicity of the region became better understood, it became necessary to re-evaluate the ability of the dam to withstand an earthquake. A subsurface exploration was completed under Mr. Wendland's field direction to better evaluate the dam fill. A site-specific seismic analysis was completed to determine the dam and spillway's seismic response, including anticipated displacement at the top of the dam.

Waikoloa Reservoir, Kamuela, Hawaii

Mr. Wendland provided senior geotechnical reviews for the reconstruction of a concrete-lined reservoir that had been severely damaged and taken out of service by an earthquake. He reviewed designs and drawings and provided guidance on remedial measures to stabilize embankments and control groundwater seepage.

Ozark Beach Dam, Forsyth, Missouri.

Performed analysis of an existing hydroelectric concrete dam for seismic stability. Work included installation of piezometers through the dam into foundation rock and completion of packer permeability testing in the bedrock. Drilling access was exceptionally difficult: a crane was required to lift the drill rig into bays of the dam during periods of low flow over the dam's spillway. The primary concern for the structure was its movement during flooding approximately 80 years ago and the adequacy of the repairs made at that time.

Dow Harris Reservoir Expansion Project, Angleton, Texas

Provided senior geotechnical reviews and oversight for the subsurface exploration and in-situ testing of soils and groundwater for this 2,000-acre reservoir that will be constructed off channel adjacent to the Brazos River. Earthen embankments as tall as 35 feet will be used to construct the dam. The field work for this project entailed over \$1MM of soil borings, test pits, in-situ testing, installation of wells, groundwater pumping tests, and laboratory testing, with strict safety and environmental protocols. Mr. Wendland directed exploration work in the field, revised testing and sampling procedures during the exploration, and led interaction with the owner's expert review panel.

Line Creek Regional Detention Basin, Kansas City, Missouri

Mr. Wendland completed slope stability and transient seepage analyses for a proposed 40-foot-tall earthen embankment within the Line Creek basin in northern Kansas City, Missouri. The analysis determined if the on-site clay soils would be suitable for use as embankment fill and if the proposed embankment would be stable while retaining a large volume of flood waters.

Electrical Transmission

Dixonville 500kV Electric Substation, Roseburg, Oregon

Mr. Wendland planned and supervised the subsurface exploration for this large substation. He completed foundation designs. During construction, he served as a resident engineer for a year, observing all earthwork, foundation construction, and structure erection.

Arizona Interconnection 345kV Electric Transmission Line, Southern New Mexico

Mr. Wendland was the lead geotechnical engineer for this 313-mile line. He completed a detailed field geological mapping and subsurface exploration program which included the use of geophysical exploration. The primary geotechnical challenges included the mountainous remote terrain and the presence of bedrock at the ground surface at many sites. The design considered that much of the right of way could only be accessed by helicopter. During construction, he served as a resident engineer for one year, observing foundation and rock anchor construction.

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During construction it was often necessary to modify foundation designs due to the steepness of the terrain and the limited access to many sites.

East-West Tie Line 238 kV Transmission Line, Ontario, Canada

Provided senior engineering support to the conceptual planning and foundation design for this 300+ mile line. The project crossed highly varied geology ranging from hard granite at the ground surface to deep swamps, requiring development of several foundation systems, including environmental limitations requiring construction be completed by helicopter in many areas. The project team developed foundation designs that minimized ground disturbance.

Poncha to San Luis Valley 115kv Line, Chaffee County, Colorado

Planned the subsurface exploration and provide senior geotechnical review services for the design of foundations in mountainous terrain. Mr. Wendland developed a system of field geologic reconnaissance and trained the engineering geologists on how to collect the necessary data through field observations and hand-dug excavations at mountainous sites where there was no access for drill rigs. Completion of soil borings at other sites was limited by the boulders and cobbles within the soil; at these sites Mr. Wendland developed alternative methods of subsurface evaluation. Mr. Wendland worked with the structural engineers to ensure they understood the complex subsurface conditions so they could avoid overly conservative designs.

Twin Counties 765-345 kV Substation, Boise City, Oklahoma

Mr. Wendland was the senior review geotechnical engineer for this large substation project. The primary concern was the impact of expansive clay soils on the long-term performance of the structures. He helped the project team developed remedial measures to reduce the impact of the expansive clays.

Line 49 Rebuild, Aldie, Virginia

Provided senior engineering oversight and quality assurance reviews. The primary geotechnical challenge was variable consistency of the upper bedrock, depth to bedrock, and depth of weathering within the bedrock, complicating design and construction of the drilled shaft foundations.

Bixby Corridor 345 kV Electric Transmission Line, Central Ohio

Mr. Wendland provided senior geotechnical review services for this monopole line. Subsurface conditions consisted of stiff sandy clay glacial till for the entire project line. He provided simplified foundation designs based on relatively uniform subsurface conditions to simplify construction and reduce construction costs.

CREZ Big Hill to Kendall Transmission Line, Central Texas

Mr. Wendland provided senior geotechnical review services for this 36-mile transmission line project. Project challenges consisted of karst geology.

500kV Electric Transmission Line, Benedict, Maryland

Lead geotechnical engineer for the design which included three river crossings and a crossing of a portion of Chesapeake Bay. The primary geotechnical challenge was the presence of deep soft mud at many tower sites combined with hurricane loading on the structures. Mr. Wendland was the resident engineer for the driving of the pile foundations for the marine structures.

Sigurd to Red Butte 345 kV Transmission Line, Southwest Utah

Provided senior geotechnical oversight and quality assurance reviews for this 160-mile-long transmission line project. The primary geotechnical challenge was adapting construction plans to the limitations of the remote desert environment that slowed construction. Mr. Wendland developed construction procedures that accommodated the construction limitations without impacting designs.

Taloga 138 kV Transmission Line, Western Oklahoma

Mr. Wendland provided field-engineering services. When foundation excavations in sandy soils for the large dead-end monopole structures proved difficult, he provided field analysis, observations, and review of alternative excavation methods for the large diameter drilled pier foundations.

Path 15 500-kV Transmission Line, Central California

Provided senior geotechnical engineering oversight and quality assurance for this 84-mile transmission line. Geotechnical challenges included the variable depth to bedrock and significant environmental constraints which limited construction activities and foundation types that could be used.

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Electrical Generation

West Java Private Power Plant, Mauk, Indonesia

Mr. Wendland was the lead geotechnical engineer for a proposed coal fired power plant. He provided field supervision of the subsurface investigation and completed the geotechnical report. He designed pile foundations and excavation supports for the large structures. Geotechnical challenges included the presence of soft clays soils with a shallow water table overlying highly fractured bedrock. The site is also in a high-risk seismic zone. Locally available construction technology limited foundation options.

Peñuelas Power Plant, LNG Port, and Electric Transmission Line, Peñuelas, Puerto Rico

Lead geotechnical engineer for the design of a power plant and adjacent liquefied natural gas (LNG) port facility in a high seismic zone. Designed the pile foundations for the power plant structures, transmission line, and dock; developed a program of preloading and surcharging to reduce settlements under the large tank structures; and designed a ground improvement program using vibro-replacement (stone columns) to reduce the risk of liquefaction. He monitored construction of all these elements. The geotechnical design and construction were complicated by the presence of contaminants and brackish groundwater.

Lungmen Nuclear Power Plant, New Taipei City, Taiwan

Mr. Wendland was the lead geotechnical engineer for the design of a two-unit nuclear power plant in a high seismic zone. He completed dynamic analyses of the subsurface profile to determine seismic loads on subsurface structures. Part of that analysis was development of a laboratory testing program to determine the dynamic properties of the crushed rock fill that was placed. He designed mat foundations for the large structures and analyzed shoring designs for deep excavations, including seismic loading on the shoring.

Escuintla Energy Center, Escuintla, Guatemala

Mr. Wendland assisted in the site selection for this power plant at a steel mill in Guatemala. He supervised the subsurface exploration and wrote the geotechnical report. He also directed the earthwork operations during construction. Geotechnical challenges included the potential for liquefaction during seismic events, the highly variable volcanic soils, and unusual groundwater chemistry and groundwater temperature due to the nearby active volcanoes.

YPF Cogeneration Plant, La Plata, Argentina

Lead geotechnical engineer for the design and construction of a cogeneration plant that provides electricity and steam to the YPF oil refinery. He supervised the subsurface exploration, wrote the geotechnical report, and completed foundation designs. The subsurface exploration included using of a dilatometer to more accurately determine the stiffness of the soils.

Marmara Power Plant and LNG Port, Marmara, Turkey

Mr. Wendland planned and supervised the subsurface exploration and wrote the geotechnical report. Geotechnical challenges included a high seismic risk and the presence of highly jointed bedrock with numerous inactive fault traces. He designed the temporary shoring and long-term support systems for deep subsurface structures, including determination of seismic loads on the buried structures.

Coal Fired Power Plant, Keti Bandar, Pakistan

Lead geotechnical engineer a coal fired power plant and new port facility in remote southeastern Pakistan. He directed the subsurface exploration and completed initial geotechnical analysis and designs. Exploration and designs were limited by locally available technology and the fact that the site was only accessible by boat.

Cogeneration Facility at Thai Ceramic Company, Saraburi, Thailand

Lead geotechnical engineer for facility that provided electricity and steam to a ceramics manufacturing plant. He directed the subsurface exploration, designed the pile foundations, and observed construction of the pile foundations. All design decisions had to consider locally available materials and local construction practices.

AES Barbers Point Power Plant, Kapolei, Hawaii

Mr. Wendland was the lead geotechnical engineer for the design and construction of this gas-fired facility. He designed pile foundations as well as a ground improvement system utilizing injection grouting for remediation of areas where the coralline limestone bedrock was poor quality.

Charles Larsen Power Plant, Lakeland, Florida

Lead geotechnical engineer. He planned and supervised the subsurface exploration. He wrote the geotechnical report and developed a ground improvement system to eliminate the need for pile foundations. The primary geotechnical challenge was the presence of loose saturated sands within inactive sinkholes.

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Warren County Power Station, Front Royal, Virginia

Mr. Wendland provided senior geotechnical review. The site is in active karst topography which greatly complicated foundation analyses.

Gordonsville Power Station, Gordonsville, Virginia

Mr. Wendland was the lead geotechnical engineer. He led the subsurface exploration in the field and designed the driven steel H-pile foundations.

Diesel Power Plant, Nejapa, El Salvador

Mr. Wendland wrote the geotechnical report and designed the large mat foundations. Geotechnical challenges for the site included the presence of soft silts in a high seismic zone. Due to the type of generator, detailed vibration analyses were required for the mat foundations.

Gadong Power Station, Gadong, Brunei

Mr. Wendland was the lead geotechnical engineer. He planned the subsurface exploration and wrote the geotechnical report. He also designed the deep drilled shaft foundations. The primary geotechnical challenges were the highly variable depth to bedrock and the presence of compressible clay soils.

West Gardner Power Station, Gardner, Kansas

Mr. Wendland was the lead geotechnical engineer; the primary geotechnical concern was the presence of shallow hard limestone bedrock. Plans called for the turbines to be supported by mat foundations bearing on the limestone bedrock. However, the hard bearing conditions would prevent adequate damping of vibrations from the turbines. To remedy the vibration concerns, Mr. Wendland provided geotechnical input on the dynamic analyses and designed rock anchors which modified the dynamic behavior of the foundations.

Solar Power

Multiple Solar Projects, Northeastern Arkansas

Mr. Wendland provided senior geotechnical engineering oversight and quality assurance reviews solar energy facilities throughout northeastern Arkansas. The primary geotechnical challenge was the presence of clay soils with a high shrink/swell potential.

Gilcrest V Solar Garden, Weld County, Colorado

Lead geotechnical engineer. The primary geotechnical challenge was variable strength of the silty sand. Pile load tests indicated some areas of the site would have much lower capacities. Mr. Wendland developed recommendations for the pile foundations that accounted for the areas with lower strength soils while not being overly conservative for other areas of the site.

Ventress Solar Project, Pointe Coupee Parish, Louisiana

Mr. Wendland provided senior geotechnical engineering oversight and quality assurance reviews. The primary geotechnical challenge was the presence of very soft clay soils and shallow groundwater. Mr. Wendland assisted the design team in the design of driven steel piles.

Oil & Gas / Ethanol

Gasoline Terminal Expansions, Several Cities

Mr. Wendland was the project manager and lead geotechnical engineer for Magellan Midstream for their expanded gasoline storage and transportation facilities in Wichita, Nashville, Minneapolis, Wilmington (DE), Midland, Omaha, Houston, Dallas, Tulsa, and Oklahoma City. At each terminal, a large steel-walled tank, truck loading structures, pumps, and pipe racks were constructed. Geotechnical challenges varied from soft compressible soils to expansive clays to strong shallow bedrock. Mr. Wendland planned the subsurface explorations, completed or directed the geotechnical foundation analyses, and completed the geotechnical report for each site. At some sites, use of innovative foundation construction methods reduced construction costs by up to \$1MM. Some sites required evaluation of on-site clay soils for use as a clay liner for secondary containment around the tanks.

Biodiesel Facilities, Several Cities

Project manager and lead geotechnical engineer for Conoco Phillips for their expanded biodiesel storage and transportation facilities in Kansas City, St. Louis, Oklahoma City, Amarillo, and Houston. At each refinery or terminal, a large steel-walled tank, truck loading, and pipe racks were constructed. Geotechnical challenges varied from soft compressible soils to expansive clays to hard caliche. Mr. Wendland planned the subsurface explorations, completed

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or directed the geotechnical foundation analyses, and completed the geotechnical report for each site. The client's safety protocols for work within their terminals and refineries were a primary focus.

HDD Analysis for Gasoline Pipeline Construction, Nebraska and Kansas

Mr. Wendland was the lead geotechnical engineer and project manager for the subsurface exploration and geotechnical analyses for several Horizontal Directional Drilling (HDD) designs for the reconstruction of a group of six gasoline and pipelines through eastern Kansas and southeastern Nebraska. Subsurface exploration was completed to depths of 100 to 130 feet at several major river crossings to determine subsurface conditions for the planned HDD under the rivers. Significant challenges included developing accurate models of boulder layers within the soil profile that would complicate the HDD work.

DRA Improvements for Aurora CO to El Dorado KS Pipeline, Colorado and Kansas

Mr. Wendland was the lead geotechnical engineer and project manager for the subsurface exploration and geotechnical analyses for improvements at four pump stations and two terminals in western Kansas and eastern Colorado. The improvements are to allow the use of drag reducing agent (DRA) within an existing gasoline pipeline and consist of new drive lanes for heavy trucks, equipment to unload the trucks, and control buildings for the new structures. Challenges included addressing expansive clay soils at some sites and soft clay soils which provide a poor subgrade for the new truck lanes at other sites.

Golden Triangle Co-Operative Ethanol Plant, Craig, Missouri

Mr. Wendland directed the subsurface investigation and completed the geotechnical report. Wendland designed a preloading program that consisted of constructing large (up to 35 feet tall) fills over the future locations of heavy tank structures. These preload piles consolidated the underlying soft soils prior to the construction of the tanks, eliminating the need for pile foundations.

Mid-Missouri Energy Ethanol Plant, Malta Bend, Missouri.

Mr. Wendland directed the subsurface investigation and completed the geotechnical report. To reduce the quantity of piles required, Mr. Wendland developed a ground improvement system (aggregate piers). A significant issue during construction was over-excavation and replacement of soft soils in some structure and pavement locations.

Industrial

Chicken Processing Facility, Fremont, Nebraska

Lead geotechnical engineer for an industrial facility that will raise and process chickens for a national grocery retailer. The facility is over 1,000 acres in size and is in the floodplain of the Platte River. Soft alluvial soils presented a risk of excessive settlements to the large industrial buildings. Mr. Wendland developed a pile load test program to optimize the design of the pile foundations.

Computer Chip Manufacturing Facility, Confidential Client, Santa Clara, California

Lead geotechnical engineer for a design/build expansion of an existing manufacturing facility. The most significant challenge was the extremely tight vibration limits at the facility during the subsurface exploration and during construction. Mr. Wendland developed a subsurface exploration program using mostly in-situ testing to reduce vibrations during the subsurface exploration and worked with the contractor to develop foundation designs that minimized vibrations during construction.

Centerpoint / Kansas City Southern Intermodal Facility, Kansas City, Missouri

Mr. Wendland planned and directed the subsurface exploration for this 500-acre industrial park. He developed geotechnical recommendations for the development and completed the geotechnical report. He also served as project manager for the special inspections during the earthwork of the development, which entailed construction work on site 24 hours per day and 7 days per week for four months.

Hydrochlorate Facilities at Chemtrade ESL Works, Fairmont City, Illinois

Lead geotechnical engineer and project manager. He planned and directed subsurface exploration and developed foundation designs for new tanks and structures. A ground improvement system using impact aggregate piers was used to reduce foundation settlement, lower foundation construction costs, and reduce the impact of seismic events.

Commercial and General Buildings

Geotechnical Engineering Support Services for General Contractor, Various Locations Nationwide

Mr. Wendland has provided geotechnical engineering support services to J.E. Dunn Construction on over 400 projects since 2005. These services include peer review of geotechnical reports, construction plans, and specifications for projects in the proposal or pre-construction phase or geotechnical engineering support on projects that are currently under construction. The projects have been in 14 states and have ranged from small additions to schools to large hospitals and review of shoring designs to assistance with large scale slope failures.

Briarcliff Hilltop Development, Kansas City, Missouri

Mr. Wendland provided geotechnical engineering services for several buildings. He planned and directed subsurface exploration programs, completed foundation designs, and completed geotechnical reports for a 10-story office building, a parking garage, a 12-story hotel, a 4-story hotel, and a series of 4-story apartment buildings. He also completed global stability analyses for five mechanically stabilized earth retaining walls that were each over 40-feet tall. The primary geotechnical challenges were the steep terrain, the presence of large amounts of rubble fill on the site, and the heavy loads from the tall buildings and tall retaining walls. Mr. Wendland also served as project manager for the special inspections during construction.

Costco, Locations in Several States

Mr. Wendland was the senior geotechnical reviewer for geotechnical work on dozens of new Costco warehouse and distribution center facilities in Colorado, Iowa, Kansas, Missouri, Nebraska, Minnesota, Oklahoma, Texas, Illinois, Indiana, Wisconsin, Michigan, and Kentucky. He provided guidance on local concerns and practices to the project team, reviewed analysis and reports, and guided selection of foundation and ground improvement systems.

New Hospital for The University of Kansas Hospital, Kansas City, Kansas

Mr. Wendland was the lead geotechnical engineer for this 15-story hospital, parking garage, and central utility plant. He planned the subsurface exploration, completed the geotechnical analyses, and developed foundation designs. The primary geotechnical challenge was the highly variable depth to rock and highly variable weathering of the bedrock. Mr. Wendland provided foundation design and construction guidance to account for the variability without complicating design or driving up construction costs. Mr. Wendland also provided geotechnical guidance for a complex retaining wall that was planned which included a below-grade stormwater detention basin immediately behind the retaining wall. During construction, Mr. Wendland provided on-site support for foundation and retaining wall construction.

Black & Veatch Headquarters Building Expansion, Overland Park, Kansas

Mr. Wendland planned and directed the subsurface exploration for this 6-story office building expansion, the largest office building in the State of Kansas based on square footage of space. He completed the project's geotechnical report, designed the drilled pier foundations, and inspected the construction of the drilled pier foundations.

Independence Events Center, Independence, Missouri

Mr. Wendland was the project manager for special inspection services for this 5,800-seat arena. The arena has a structural steel frame with precast concrete exterior walls. Services included monitoring and testing earthwork, observing installation of auger-cast pressure-grouted piles, laboratory testing of the pile grout, field and laboratory testing for concrete, erection of precast concrete, and field and laboratory testing of fireproofing and masonry.

Sam's Club #4808, Springdale, Arkansas

Mr. Wendland completed a detailed second phase subsurface exploration to allow for a re-evaluation of grading plans. Earthwork costs were \$500,000 over budget due to the lack of select non-expansive fill on the project site. Mr. Wendland proposed that the shallowest soils had not been well evaluated by the original geotechnical report and that a more thorough sampling and testing of the upper 4 feet of clay soils could show that it was suitable for use as select non-expansive fill. The proposed additional exploration was completed, the shallow soils were proven to be suitable for use as the select fill, and the grading plans were revised accordingly, saving the owner \$500,000.

JE Dunn Construction New Headquarters, Kansas City, Missouri

Mr. Wendland provided geotechnical engineering support services to JE Dunn Construction during the construction of their new corporate headquarters and adjacent parking garage. Mr. Wendland evaluated shoring designs and designed truck access ramps that were constructed into the excavation. He also provided bi-weekly inspection of the shoring and rock excavations.

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Garmin Headquarters Office Tower, Olathe, Kansas

Planned and directed the subsurface investigation for a nine-story office building, warehouse addition, and parking garage. The project utilized drilled pier foundations with end bearing on a deep massive limestone formation and side resistance on shallower shale, sandstone, and limestone units. Mr. Wendland also provided field engineering services during construction of the drilled pier foundations.

Shoring Design for Pedestrian Tunnel Reconstruction, Bartlesville, Oklahoma

Lead geotechnical engineer and project manager for the design and construction of a steel sheet pile with internal bracing shoring system that was installed for the reconstruction of a pedestrian tunnel under a street. Geotechnical challenges included the highly variable depth to bedrock, which complicated driving of the sheet piles, and the need to protect adjacent structures from damage due to the excavation and pile driving.

Retail Distribution Center, Confidential Client, Denver, Colorado

Mr. Wendland provided senior geotechnical oversight and review for a 1,000,000 square-foot distribution center. The primary geotechnical challenge was the presence of expansive clay soils with sulfites. Mr. Wendland worked with the project team and the contractors to develop a cost-effective remedial earthwork program to reduce the shrink/swell potential of the on-site clays while minimizing the risk that the sulfites would undergo long-term expansion that could damage the floor slab or pavements.

Grainger Distribution Center, Kansas City, Missouri

Mr. Wendland was the project manager and lead geotechnical engineer for a 1.5 million square foot distribution center in the flood plain of the Missouri River. The soft, compressible alluvial soils in the project area can necessitate the use of higher cost pile foundations for similar structures. Mr. Wendland developed a plan for in-situ testing of the on-site soils with dilatometers and cone penetrometers to develop a more accurate understanding of the soil properties. This specialized testing allowed for use of less costly footings. Also, the test results allowed the elimination of a construction delay that was planned after site grading by understanding that the settlement from the placement of fill would occur relatively rapidly, shortening the construction schedule by 3 months.

Arrowhead Stadium, Kansas City, Missouri

During the renovation of this NFL stadium in 2007, Mr. Wendland designed the drilled pier foundations for the new press box that was constructed on the top level of the stadium. The analysis included extensive analysis of the lateral load capacity of the foundations including bearing capacity of the shale bedrock.

Midland Theatre Renovation, Kansas City, Missouri

Mr. Wendland served as project manager for the special inspection services for the renovation of the 80-year-old Midland Theatre. The total renovation of this magnificent structure included construction of new elevator shafts, stairwells, and mechanical shafts. The project presented many engineering challenges including establishing the structural properties of the building's 80-year-old structural steel frame, adapting designs to unexpected conditions encountered during demolition, adapting construction practices to difficult access areas within the building, and avoiding damage to the building's ornate plaster walls. The special inspections included foundation bearing evaluations, testing of concrete, testing of structural masonry, testing of topping slabs, observation of bolt installation, observation of installation of dowels into existing concrete, welding of structural steel, and application of fireproofing.

Wal-Mart Supercenter, Fort Worth, Texas

Mr. Wendland provided senior geotechnical support for this difficult project site. A Wal-Mart supercenter was constructed on a sloped site. MSE retaining walls with maximum heights of approximately 30 feet were constructed. The subsurface conditions at the site consist of deep, soft, compressible, alluvial soils. Therefore, the building and retaining walls underwent large amounts of settlement. Mr. Wendland analyzed the settlement, reviewed options with the project team, and developed systems for deep foundation support or ground improvement. The ground improvement system was less costly and quicker to construct, saving the client approximately \$200,000 and shortening construction schedules by approximately two months.

MetLife Regional Headquarters Building, Kansas City, Missouri

Mr. Wendland was lead geotechnical engineer for a three-story building that was built in a geotechnically challenging location on the north bluff of the Missouri River valley. Uphill, the building was cut into massive limestone bedrock. In the central portion of the building, the final grades were excavated into loess soils overlying weathered limestone bedrock. The southern portion of the building required placement of a significant volume of fill over a marginally stable slope. Foundations for the structure varied from footings bearing on exposed limestone bedrock on the uphill portion of the site to deep drilled piers excavated through highly variably weathered limestone bedrock on the downhill portion of the site.

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Symphony Park Development, Parcel L, Las Vegas, Nevada

Mr. Wendland provided senior geotechnical engineering support for this project which included a 17-level assisted living facility, a five-level medical office building, and a 5-level parking garage on a parcel of land that is known to be contaminated and to have existing rubble fill. Mr. Wendland provided guidance on foundation designs and subgrade preparation for floor slabs-on-grade. Mr. Wendland's guidance focused on developing a floor slab subgrade that would limit the risk of long-term damage from expansive clay soils while minimizing the cost associated with removal of the existing contaminated rubble in the area.

Olson Performing Arts Center Addition at UMKC, Kansas City, Missouri

Mr. Wendland was the lead geotechnical engineer for this project. Geotechnical challenges were evaluating the on-going foundation problems that had been experienced within the existing structure and providing geotechnical guidance to remediate those problems while minimizing the risk of similar problems with the new structure. The foundation problems within the existing structure were due to expansive clay soils that had been desiccated by the roots of nearby mature trees, then saturated by plumbing leaks. Mr. Wendland provided geotechnical guidance including the use of structural floor slabs over void forms to limit the risk of further damage from swelling clays.

Construction Haul Roads and Excavation Dewatering for School Construction, Kansas City, Kansas

Mr. Wendland provided geotechnical engineering support to the general contractor on the construction of six new school buildings. Services included the design of construction haul roads to handle heavy truck traffic delivering precast concrete wall panels, the design of crane pads, and consulting on dewatering and stabilization of construction excavations.

Data Centers

Data Center, Confidential Client, Phoenix, Arizona

Mr. Wendland was the senior geotechnical engineer for an initial geotechnical desk study of four sites in the Phoenix area. The desk studies summarized geotechnical concerns and preliminary recommendations for foundations, floor slabs, earthwork, and pavements for each site where a 3,000,000 square-foot data center campus was being considered. After a site was selected, Mr. Wendland provided senior geotechnical oversight for the geotechnical investigation and analysis for the 400-acre site. Primary geotechnical concerns included the presence of existing uncontrolled fill from agricultural operations at the site, the heavy foundation loads, and the tight limits on floor slab movements.

Data Center, Confidential Client, Pryor, Oklahoma

Mr. Wendland provided geotechnical support services to the general contractor during construction of a 1.5-million square foot data center consisting of three large buildings and an electrical substation. Mr. Wendland assisted the contractor with the evaluation of on-site soils for use a select fill under the floor slabs and with design of construction haul roads.

Data Center, Confidential Client, Kansas City, Missouri

Provided geotechnical support to the owner and general contractor. Completed detailed peer review of draft geotechnical report. Worked with geotechnical engineer and design team to shorten construction delays that were planned due to settlement of soils under the weight of planned thick fill sections. Worked with geotechnical engineer to develop a more accurate understanding of groundwater seepage concerns on the site. During construction, provided assistance to general contractor with stability and dewatering of deep sewer excavations, bearing stability under heavy cranes, and evaluation of settlement of thick fill sections.

Data Center, Confidential Client, Papillion, Nebraska

Mr. Wendland provided geotechnical support services to the general contractor during construction of a 1-million square foot data center consisting of two large buildings and an electrical substation. Mr. Wendland assisted the contractor with the evaluation of on-site soils for use a select backfill materials for large, complex retaining walls.

Transportation

Northeast Oklahoma County Loop Turnpike, Oklahoma City, Oklahoma

Provided senior engineer oversight and review for a large new interstate highway. Mr. Wendland provided senior consultation to the project geotechnical engineers as they analyzed and designed the bridge foundations, retaining walls, and embankments.

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President George Bush Turnpike - Eastern Extension, Dallas, Texas

Provided quality peer reviews for retaining wall designs on this design/build project. Produced a Wall Acceptance Report for each retaining wall (a total of 57). Each report documented all engineering and construction activities associated with that wall.

Pena Boulevard Improvements at Denver International Airport, Denver, Colorado

Provided senior geotechnical guidance and senior reviews for the analysis and design of retaining walls, embankments, and bridge foundations for the planned widening of the main entrance road into Denver International Airport. Technical challenges included remediation of soils with high sulfate content, remediation of soils and claystone with a high swell potential, and accurate modeling of the long-term strength of the claystone and shale.

BNSF Industrial Track Expansion, Sibley, Missouri

Senior geotechnical engineer and senior quality reviewer for a proposed widening of railroad tracks near a major river bridge. The primary geotechnical concern was the presence of deep soft soils which resulted in unstable embankments. Mr. Wendland developed a system of ground improvement combined with staged construction of the new embankments along with geogrid reinforcement of the new embankment fill in order to provide an adequately stable embankment for the new rail lines.

BNSF Missouri River Bridge 3.8, Plattsmouth, Nebraska

Mr. Wendland was senior quality reviewer of a n11-span, 1,680-foot-long bridge over the Missouri River. The primary geotechnical challenge was the design and construction of a steep cut over 100 feet deep into the loess soils on the west bank of the river. Mr. Wendland worked with the design team to develop stable but nearly vertical cuts that minimized the amount of right-of-way acquisition required.

Johnson County Gateway Interchange, Johnson County, Kansas

Provided senior review services for large highway design/build project. He provided guidance at the start of the project on geologic classifications and reporting for the subsurface exploration. His review services focused on the impact of the geology in the design and construction of the highways, bridges, retaining walls, and culverts. He provided excavation safety assessments for micro-tunneling operations. He developed an innovative foundation treatment for retaining walls on shale bedrock that used concrete protective layers to reduce the risk of long-term softening of the shale, which significantly reduced construction costs.

Red Bridge Road over the Blue River and Union Pacific Railroad, Kansas City, Missouri

Mr. Wendland was the geotechnical engineer for the new bridge for Red Bridge Road over the Blue River and UPRR. He planned and directed the subsurface exploration and completed the foundation analysis, retaining wall analysis, and geotechnical report. The subsurface exploration was complicated by the dense woods, sloped terrain, and the presence of railroad tracks, a river, and swampy ground. Mr. Wendland designed a geogrid-reinforced crushed rock mattress below the taller MSE retaining walls to limit differential settlement.

Chouteau Parkway Improvements, Kansas City, Missouri

Lead geotechnical engineer. A significant part of the geotechnical analysis for this project was the stability of planned deep cut slopes and tall, long mechanically stabilized earth (MSE) retaining walls. The cut slopes required excavations as deep as 50 feet in loess soils. Three major MSE retaining walls were constructed, with heights as great as 40 feet. He developed cut slope geometry for the loess soil and completed global stability analyses for the cut slopes and MSE retaining walls.

BNSF Replacement Bridge 369.9, Bosworth, Missouri

Lead geotechnical engineer for the replacement of this rail bridge in central Missouri. The primary geotechnical challenge was the presence of deep, soft alluvial and glacial soils. Boulders within the glacial soils prevented driving pile foundations to bedrock. Mr. Wendland developed a solution of using friction piles and drilled shafts.

I-30 / I-35 Horseshoe Project, Dallas, Texas

Senior level review of design and geotechnical analysis (including global stability) of over 130 large retaining walls. He established standard methods for analysis and reporting of retaining wall designs for the large project which allowed for efficient, rapid, high quality engineering work.

Eldon Model Airport Runway Extension, Eldon, Missouri

He provided geotechnical engineering services including subsurface exploration, analyses, and the geotechnical report for the extension of the existing runway and construction of a new taxiway. During construction, Mr. Wendland served as the project manager for the construction observation and materials testing services.

Steve Wendland, PE, PG, DGE

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Pavement Repairs Runway 1L-19R at KCI Airport, Kansas City, Missouri

Mr. Wendland was the project manager for the materials testing of concrete used to repair the runway. He supervised teams of technicians and field engineers who observed placement of the concrete, completed field testing, made samples of the concrete, and completed laboratory testing of those samples.

Highway 152 Bridges over Ambassador Drive, Kansas City, Missouri.

Mr. Wendland planned the subsurface investigation and wrote the geotechnical report for two four-span bridges. Geotechnical challenges included the requirement for deep foundations bearing on bedrock while the depth to bedrock was approximately 110 feet. A combination of steel H-piles and drilled piers was used to support the bridges through the deep glacial soils.

Scour Repair – S 57th Ave. W. - Bridge over Berryhill Creek, Tulsa, Oklahoma

Mr. Wendland was the lead geotechnical engineer for the analysis of scour that damaged the abutment of an existing bridge. Dumping of demolition debris in the creek channel had forced a realignment of the creek channel that scoured away the original bridge abutment. Mr. Wendland designed a gabion retaining wall to protect and stabilize the abutment and a gabion blanket to limit further scour in the bottom of the creek channel.

87th Street Realignment, Kansas City, Missouri.

Mr. Wendland planned the subsurface investigation and wrote the geotechnical report for improvements to 87th Street over an approximately 1.3-mile segment between US Highway 71 and I-435. The improvements widened the road and improved the vertical and horizontal alignments. The geotechnical work focused on the shallow, massive, hard limestone bedrock. A major geotechnical concern for the project was the presence of unstable underground mines present approximately 50 feet below a portion of the existing road alignment. The subsurface investigation determined the horizontal extent of the mine works. The geotechnical analysis developed guidelines for re-alignment of the road away from the unstable mines.

Valley View Parkway Bridge over Little Blue River at Eastland Center, Independence, Missouri.

Mr. Wendland planned the subsurface investigation and wrote the geotechnical report for a four-span concrete bridge over the Little Blue River and two large box culverts at Adair Creek within the Eastland Center development. Geotechnical challenges included approximately 70 feet of soft alluvial clay at the site. To avoid the expense of using pile foundations on the culverts, a program of settlement monitoring and changes to the structural design of the culverts to increase the settlement tolerance of the structures was implemented, significantly reducing construction costs for the culverts.

31st Street Bridge Replacement over Wyandotte Street, Kansas City, Missouri.

Mr. Wendland planned the subsurface investigation and wrote the geotechnical report for a three-span concrete bridge to replace an existing concrete bridge. Geotechnical challenges included approximately 30 feet of uncontrolled fill and unstable abutment slopes. Drilled pier foundations were developed to support the bridge through the uncontrolled fill. Drilled piers were also used to support a retaining wall which would stabilize the east abutment so that it would not fail and endanger existing adjacent buildings when the existing bridge was demolished.

Butler Memorial Airport Runway Reconstruction, Butler, Missouri

Mr. Wendland was the lead geotechnical engineer for the planned reconstruction of the runway at a county airport. The existing runway had experienced significant deterioration. He determined the subsurface conditions, evaluated the likely causes of the deterioration, and provided recommendations for remediating the problems. Geotechnical concerns included shallow groundwater, which cause a soft pavement subgrade. Mr. Wendland recommended that the new runway have a subgrade stabilized with Class C fly ash and a drainable sub-base.

Grand Avenue and Front Street Improvements, Kansas City, Missouri

Mr. Wendland was the lead geotechnical engineer. He planned and directed subsurface exploration and geotechnical engineering services for the proposed extension of Grand Avenue and realignment of Front Street west of I-35 and along the south bank of the Missouri River. The project also involved an analysis of the risk of excessive settlement that could occur around existing large diameter sewer outfall structures that would be covered by the road's embankment fill. A portion of this project is within the Missouri River levee critical zone. Mr. Wendland also served as the project manager for the materials testing during the construction.

2011 to 2020 Oklahoma DOT On-Call Geotechnical Services Contract, Statewide, Oklahoma

Mr. Wendland provides senior geotechnical engineering reviews for numerous bridge, roadway, pedological, retaining wall, and embankment projects throughout the state.

Steve Wendland, PE, PG, DGE

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Water and Wastewater Treatment

Fishing River Wastewater Treatment Plant Expansion, Kansas City, Missouri

Mr. Wendland was the lead geotechnical engineer for the design of the major expansion. He planned and directed the subsurface exploration program. He designed a system of shallow and deep foundations to support the structures and completed the geotechnical report. The primary geotechnical challenges included the presence of deep, soft clays and the variable depth to bedrock. Due to the potential for settlement of the large, heavy structures bearing on the soft clays, a program of preloading was developed.

Edgerton Wastewater Treatment Plant and Sewer, Edgerton, Kansas

Mr. Wendland was the lead geotechnical engineer for the design of a wastewater treatment plant and the three-mile-long sewer. He planned the subsurface exploration through varied and rough terrain. He completed the foundation bearing capacity and settlement analyses for the large structures. The primary geotechnical challenge for the sewer was excavation of shallow, hard limestone bedrock. Also, construction of the sewer required a tunnel under Interstate Highway 35. Mr. Wendland provided recommendations for location of the tunnel (based on varying subsurface conditions). For the treatment plant, the primary geotechnical challenge was the variable depth to rock, which required mixed foundation systems (mats and drilled shafts).

Pleasant Run Deep Tunnel Retrieval Shaft, Indianapolis, Indiana

Mr. Wendland was the senior review geotechnical engineer for the design of a structural slurry wall that was constructed to maintain a stable and dry excavation at the end of a deep sewer tunnel. The excavation was 130 feet deep and 30 feet diameter. The primary geotechnical challenge was socketing the bottom of the slurry wall into the top of the weathered limestone bedrock.

Sand Springs Wastewater Treatment Plant, Sand Springs, Oklahoma

Mr. Wendland provided senior engineering review for the geotechnical design and analysis. The analysis required evaluation of several foundation types to support heavy structure loads while minimizing ground disturbance due to contamination of the on-site soils. During construction, Mr. Wendland provided guidance to the owner when the foundation contractor experienced difficulties with pile installation and requested design modifications.

Water Treatment Plant Improvements, Atchison, Kansas

Planned the subsurface investigation, analyzed foundations, and completed the geotechnical report. The primary geotechnical challenge was differential settlement for a large cast-in-place concrete water tank which would bear on the deep glacial till soils. Mr. Wendland developed recommendations for pile foundations to support the tank.

Arrowhead Water Main Phases 1 and 2, Kansas City, Missouri

Mr. Wendland was the geotechnical engineer for the new 54-inch and 60-inch diameter water mains. He planned and directed the subsurface exploration. Many of the borings required significant traffic control plans. The primary geotechnical challenge was excavation of a significant amount of bedrock. Mr. Wendland also provided geotechnical engineering support and materials engineering support services during construction.

Disinfectors at Rocky Branch and Todd Creek Wastewater Treatment Plants, Kansas City, Missouri

Lead geotechnical engineer for the design of disinfectors. He planned and directed the subsurface exploration, designed a ground improvement system to provide foundation support for the new structures, and completed the geotechnical reports. The primary geotechnical challenge was the presence of soft, alluvial soils.

Second Creek Sewer Interceptor, Kansas City, Missouri

Planned and directed the subsurface exploration and geotechnical engineering services for the 8-mile-long sanitary sewer. The planning required extensive coordination with landowners to reduce disturbance to agricultural fields. The primary geotechnical challenge on the project was the presence of shallow bedrock.

Water System Improvements, Ozark Beach, Missouri

The project involved expanding the municipal water supply system. The area has rough, hilly terrain and shallow but irregular bedrock. The geotechnical challenge was accurately assessing where shallow rock would complicate excavations for construction of the new water lines. Mr. Wendland was the lead geotechnical engineer.